



## Worksheet 2 Number systems, ASCII and Unicode

### Task 1

1. Convert the following decimal values into 8-bit binary bytes:

a)  $10_{10}$

b)  $104_{10}$

c)  $255_{10}$

2. A single byte can be used to represent the decimal values  $0_{10}$  to  $255_{10}$ . For values over  $255_{10}$ , bytes can be joined together. In a computer that has a 16-bit bus width, an integer would be stored in two consecutive bytes.

For example, to represent  $654_{10}$  the two bytes used would be:

Byte 2								Byte 1							
$2^{15}$	$2^{14}$	$2^{13}$	$2^{12}$	$2^{11}$	$2^{10}$	$2^9$	$2^8$	$2^7$	$2^6$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$
0	0	0	0	0	0	1	0	1	0	0	0	1	1	1	0

Convert the following denary values into 2 bytes:

a)  $127_{10}$

b)  $3188_{10}$

c)  $65535_{10}$

3. Put the following byte prefixes in order of size from smallest to largest:

mega    gibi    kibi    tebi    kilo    giga    tera    mebi

Prefix	Symbol	Number of bytes
	k	1,000
	Ki	1,024
	M	1,000,000
	Mi	1,048,576
	G	1,000,000,000
	Gi	1,073,741,824
	T	1,000,000,000,000
	Ti	1,099,511,627,776



		6
--	--	---

## Task 2 Representing characters

1. Using the 'ASCII codes' helpsheet, answer the following questions:

- What is your forename in ASCII?
- Convert the following ASCII sentence to text:

<b>010001</b> 00	<b>010011</b> 10	<b>010000</b> 01	<b>001000</b> 00	<b>011101</b> 11	<b>011000</b> 01
<b>011100</b> 11	<b>001000</b> 00	<b>011001</b> 00	<b>011010</b> 01	<b>011100</b> 11	<b>011000</b> 11
<b>011011</b> 11	<b>011101</b> 10	<b>011001</b> 01	<b>011100</b> 10	<b>011001</b> 01	<b>011001</b> 00
<b>001000</b> 00	<b>011010</b> 01	<b>011011</b> 10	<b>001000</b> 00	<b>001100</b> 01	<b>001110</b> 01
<b>001110</b> 00	<b>001101</b> 00	<b>001011</b> 10			

- Explain why when adding the characters '2' + '3' you don't get 5:
- Create a spreadsheet that can convert a word of up to 8 characters into ASCII character codes. (Use the menu option Formulas, Show formulas or press Ctrl + ` to display the formulas in a spreadsheet.. The ` character is the top leftmost key on the keyboard.)

	A
1	a
2	=CODE(A1)
3	=DEC2BIN(A2,8)

## Worksheet 2 ASCII and Unicode

### Data types



PG ONLINE

Extend the spreadsheet to convert ASCII binary codes back to regular characters.

5	1100001
6	=BIN2DEC(A5)
7	=CHAR(A6)